

What is Claimed is:

10083653 022702
1. A backup power supply built in a power supply circuit for converting an alternating current received
5 from a commercial AC power supply to a direct current and a load operated by said current generated by said power supply circuit, comprising:

at least one AC-DC converter connected to said commercial alternating current, a load connected to a
10 DC output side of said AC-DC converter, at least one two-way DC-DC converter with one side thereof connected to said DC output side, and a secondary battery connected to another side of said two-way DC-DC converter, wherein:

15 when a load current is a predetermined peak cut current or larger, said backup power supply supplies a differential current between said load current and said predetermined peak cut current to said load from said secondary battery via said two-way DC-DC
20 converter.

2. A backup power supply according to Claim 1, wherein

when said load current is smaller than said
25 predetermined peak cut current, said backup power

supply supplies said load current from said AC-DC converter, charges said secondary battery using said two-way DC-DC converter by a charging current having an upper limit of a predetermined current, takes in
5 only a current equivalent to a differential current between said predetermined peak cut current and said load current from said two-way DC-DC converter.

3. A backup power supply built in a power supply
10 circuit for converting an alternating current received from a commercial AC power supply to a direct current and a load operated by said current generated by said power supply circuit, comprising:

at least one AC-DC converter connected to said
15 commercial alternating current, a load connected to a DC output side of said AC-DC converter, at least one two-way DC-DC converter with one side thereof connected to said DC output side, and a secondary battery connected to another side of said two-way DC-
20 DC converter, wherein:

when a load current is a predetermined peak cut current or larger, said backup power supply supplies a differential current between said load current and said predetermined peak cut current to said load from
25 said secondary battery via said two-way DC-DC

10083333-022707

converter and performs a peak cut operation and when
said load current is smaller than said predetermined
peak cut current, said backup power supply supplies
said load current from said AC-DC converter and
5 charges said secondary battery via said two-way DC-DC
converter.

4. A backup power supply according to Claim 3,
wherein said charging current for charging said
10 secondary battery has an upper limit of a
predetermined current and said backup power supply
takes in only a current equivalent to a differential
current between said predetermined peak cut current
and said load current from said two-way DC-DC
15 converter and charges said secondary battery.

5. A backup power supply according to Claims 1 or 3,
wherein
said backup power supply has detection means for
20 detecting said charging and discharging currents of
said secondary battery, means for detecting a voltage
of said secondary battery, and a circuit for
calculating a residual capacity of said secondary
battery and changes said predetermined peak cut
25 current according to said residual capacity of said

10033336.032703

secondary battery.

6. A backup power supply according to Claim 5,
wherein

5 when said residual capacity of said secondary
battery is reduced lower than a predetermined capacity,
said peak cut operation is stopped.

7. A backup power supply according to Claim 5,
10 wherein

when said residual capacity of said secondary
battery is reduced lower than said predetermined
capacity at a time of service interruption or at a
time of occurrence of a fault of said AC-DC converter,
15 a discharge operation is performed.

8. A backup power supply according to any one of
Claims 1 to 3, wherein

from said residual capacity of said secondary
20 battery and said load current, said backup power
supply has a function for calculating and displaying a
service interruption holding time at said point of
time.

25

10083638.062704

9. A backup power supply according to any one of Claims 1 to 3, wherein

from said residual capacity of said secondary battery and said load current, said backup power supply calculates said residual capacity of said secondary battery necessary to ensure a predetermined service interruption holding time at said point of time and performs said peak cut operation within a range having said calculated residual capacity.

10. A backup power supply according to any one of Claims 1 to 3, wherein a voltage at a connection point of said AC-DC converter and said two-way DC-DC converter is higher than a voltage of said secondary battery, and when said two-way DC-DC converter is discharged from a side of said secondary battery, said converter is operated as a booster chopper circuit, and when said secondary battery is charged, said converter is operated as a voltage reduction chopper circuit.

11. A backup power supply according to any one of Claims 1 to 3, wherein

said backup power supply has n storage means for dividing a preset time period into n parts by a

10055538.022702

sampling time sufficiently shorter than said period
and corresponding to said divisions, means for
detecting said load current, and means for calculating
a mean value of load currents from said detected load
5 current and a last value stored in corresponding
storage means, overwriting in said corresponding means,
and changing said predetermined peak cut current from
said calculated new mean value of load currents.

10 12. A backup power supply according to Claim 11,
wherein

said preset time period is 24 hours.

15 13. A backup power supply according to Claim 11,
wherein

said preset time period is one week.

14. A backup power supply comprising an AC-DC
converter connected to a commercial alternating
20 current, a load connected to a DC output side of said
AC-DC converter, a DC-DC converter with one side
thereof connected to said DC output side, and a
secondary battery connected to one side of said DC-DC
converter, wherein

25 said DC-DC converter has means for alternately

switching a short-circuit mode for short-circuiting
said secondary battery and an inductance by a
switching element and a booster mode for ejecting
energy stored in said inductance in said short-circuit
5 mode to said load, means for detecting an inductance
current in said booster mode, and mean for averaging
said inductance current in said booster mode, and only
when a result obtained by subtracting a predetermined
peak cut current level from said load current is
10 positive, sets said value as a peak cut current
command value, compares said value with said averaged
current, and controls a ratio of said short-circuit
mode to said booster mode.

15 15. A backup power supply built in a power supply
circuit for converting an alternating current received
from a commercial AC power supply to a direct current
and a load operated by said current generated by said
power supply circuit, comprising:

20 at least one AC-DC converter connected to said
commercial alternating current, a load connected to a
DC output side of said AC-DC converter, at least one
two-way DC-DC converter with one side thereof
connected to said DC output side, a secondary battery
25 connected to another side of said two-way DC-DC

10083553.002700

converter, a service interruption fault detection
circuit portion connected to said commercial
alternating current, a two-way operation mode change-
over circuit portion, a drive signal change-over means
5 for changing over a drive signal of said two-way DC-DC
converter by receiving a signal which is output by
said two-way operation mode change-over circuit, a
discharge control circuit portion for outputting a
discharge control signal to said two-way DC-DC
10 converter through a drive signal change-over means,
and a SOC calculation portion for calculating a
residual capacity of said secondary battery, wherein
an output of said SOC calculation portion is
received by said charge control circuit portion.

2025 RELEASE UNDER E.O. 14176